The Mining Journal

London, June 28, 1957

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Vol. 248 **No. 6358**

Established 1835

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Published each Friday by
THE MINING JOURNAL LTD.

Directors
E. Baliol Scott (*Chairman*) U. Baliol Scott (*Managing*)
G. A. Baliol Scott R. A. Ellefsen

15, WILSON STREET, LONDON, E.C.2.

Telegraphic Tutwork London
Telephone MONarch 2567 (3 lines)

Annual Subscription £2 10s. Single copy ninepence

Japanese Investment in S.E. Asia

THE Commonwealth Conference in London comes at a time when the Japanese commercial and government drive to expand trade and investment in South East Asia and other under-developed countries appears to be gathering increasing momentum. An overall aim of this more dynamic policy is to convince South East Asia that Japan is both willing and able to assist in its economic development.

As part of the drive for trade expansion Japanese diplomatic staffs throughout Asia are being reinforced with young technical experts to advise and assist in the drafting and implementation of schemes for economic co-operation. Government subsidies to technical co-operation and investment associations, such as the Japan Heavy Machinery Technical Service Association, are being sharply increased, while Japanese budgetary appropriations for instruction under the Colombo Plan has also been raised. The Japanese Export-Import Bank will in future be permitted to grant loans to Japanese concerns furnishing technical assistance abroad. Earlier this year Mr. Kano, vice-president of the Export-Import Bank, visited a number of countries in South East Asia.

A Japanese floating machinery fair on the "Nissho Maru" has also been touring South East Asia. It was sponsored by the Japanese Machinery Exporters' Association in conjunction with banks, insurance companies and various trade associations. Supervision and much of the cost was undertaken by the government.

One of Japan's most urgent needs is, of course, to assure adequate suppplies of raw materials for her expanding metal industries and here the more vigorous approach to economic policy is already bearing abundant fruit.

A contract for the importation of 1,300,000 tons of iron ore was recently concluded between the seven major Japanese steel companies and the State Trading Corporation of India. This is additional to contracts totalling 500,000 tons of iron ore which had previously been concluded with India by various Japanese firms.

The Malayan Federal government has approved the formation of a company for the joint development of the Temangan iron ore mines in Kelantan. A Japanese firm undertook to invest 49 per cent of the capital, mainly in the form of machinery and equipment. The balance is held by two British firms. Three leading Japanese producers are behind the programme and will receive the total production. Another company has been formed by Japanese and Malayan interests to recommence operation of the Endau iron mines in Malaya. The two Japanese firms concerned have undertaken to advance sterling to the company in the form of equipment, machinery and materials.

In Thailand, a Japanese company in association with a Thai firm is launching a joint mining venture. The Japanese company is contributing 49 per cent of the capital and will also supply mining machinery and equipment. Work is to be started on four partially developed wolfram and tin mines in South Thailand. Japanese geological experts have assisted Ministry of Industry officials to carry out a survey of iron ore deposits in Loey and

Uttaradit provinces. Japanese technicians have been engaged in a survey of Thailand's oil resources and an oil refinery is to be constructed at Bang-na by a Japanese concern. A plant to develop uranium mines in Thailand is being studied by another Japanese company.

Japan's biggest chemical engineering firm has applied to the Ceylon Government for an option to purchase the entire ilmenite output from Pulmoddai on the east coast of the island. The view has been expressed that the Japanese would pay a good price for this mineral, since they claim to have perfected a process which would enable them to manufacture titanium metal much more cheaply than it can be produced in the U.S. by present methods.

The Japanese have also shown great interest in the prospects of joint development of mining operations in the Philippines. For instance, advances in the form of machinery and equipment were made by Japanese companies to Atlas Consolidated Mining and Development Corporation to launch its copper mining operations at Toledo and Cebu.

There is, of course, no cause for surprise at Japanese ambitions to play a leading role in the economic development of South-East Asia, which are the inevitable outcome of the resurgence of this vigorous and aggressive nation as an industrial power.

The paramount consideration is that financial and technical assistance should be forthcoming on the scale which is needed to lift Asia's struggling millions (inside and outside the Commonwealth) from the poverty which—humanitarian considerations apart—is a breeding ground for Communism and disease.

If the necessary assistance is not forthcoming from within the Commonwealth, then the Far East will turn elsewhere—and not only to Japan. It has become a matter of extreme urgency, therefore, that the pound should be strengthened in order that Britain may be able to maintain her traditional role as the financial centre of an expanding Commonwealth. From this aspect the European Common Market, paradoxical though it may seem, seems to offer the most encouraging prospects for a prosperous Commonwealth.

"SPRINGBOKS" TO SINK SHAFTS FOR N.C.B.

About four years ago the National Coal Board sponsored a mission to the Union of South Africa to study shaft-sinking methods. Impressed as the team undoubtedly was with what they saw, they were unable to persuade U.K. contractors to apply the South African techniques. The reasons for rejecting the adoption of this "know-how" from the Union were never aired in public and, to all intents and purposes, the report by the mission to the Coal Board was shelved. That the whole idea was dropped, however, obviously bore no relation to the efficacy of South African shaft-sinking methods as in this specialized aspect of mining South African personnel hold practically every word record. Admittedly, shaft-sinking personnel are the most highly paid technicians in the South African gold mining industry, but this can hardly have been used as a legitimate reason for dismissing out of hand the adoption of techniques which result in shafts being sunk at about three times the present rate achieved in this country.

From whatever point pressure was built up sufficiently to strangle the importation of this particular know-how at that time, good ideas no less than good men cannot be thwarted for long. It is, thus, most encouraging to read that the National Coal Board has now appointed a Johannesburg firm of civil engineers, the Roberts Construction Company, to supervise the sinking of two new 2,800 ft. shafts for the Coal Board. The Roberts Construction Company will be consultants and co-contractors to a British firm and to support their belief in their methods about 17 shaft-sinking specialists together with equipment designed and manufactured in South Africa are coming to Britain to direct the central part of the operation which will be ready about next November or December.

In venturing to come to the United Kingdom for the sinking of the two 24 ft. dia. circular shafts, the Roberts Construction Company pays tribute to the South African gold mining industry. In an interview given to the *Rand Daily Mail* earlier this month, Mr. Roberts declared that his company would not have been able to carry this project this far if it had not received the co-operation of the gold mining industry, which has approved the demonstration abroad of the advances made by South African mining engineers in developing new methods, new equipment and highly-trained personnel for this specialized type of work.

What kind of a reception the Roberts Construction Company will receive in this country it is impossible to judge. Certainly, the cross-fertilization of ideas as between metalliferous mining and coal mining is a trend to be encouraged quite as much as the exchange of useful ideas between members of the Commonwealth.

Normally, that would be the end of the story. But Mr. Roberts has another purpose in mind and that is to convince young men in Britain that if they wish to study the art and science of mining, the best training and experience they can get is on the South African gold fields.

Job satisfaction and higher earnings are listed among the incentives which the Roberts organization holds out to prospective emigrants to South Africa. However, the immobility of labour in this country, particularly in the coal fields, is well-known and it remains to be seen whether pride, status and money are big enough carrots to overcome traditional inertia, "the local", and strong ties of friendship.

THE SOUTH AFRICAN GOLD MINING INDUSTRY—ITS PROGRESS AND PROBLEMS

The South African gold mining industry, its prospects and problems, formed the central theme of the presidential address to the Transvaal and Orange Free State Chamber of Mines delivered in Johannesburg earlier this week by Mr. C. B. Anderson.

His review of the gold industry threw up a picture in which sharp contrasts rather than blending shades of grey provided the feature. On the one hand, were the old established mines of the Witwatersrand, still responsible for the larger proportion of the country's gold output, but increasingly susceptible to the eroding factors common to all gold mines of a fixed price for the product and the inexorable rise of working costs. On the other, were the young and expanding mines in the new producing fields of the Far Western Rand, Klerksdorp and the Orange Free State, with their considerably richer orebodies and free as yet from the full blast of crippling taxation. In these fields time has recorded progress and achievement, and points to yet brighter days to come. But on the older Witwatersrand progress could only be interpreted in the context of problems overcome and the devising and application of new engineering skills and techniques to prolong the working lives of mines whose profit margins were continuously decreasing.

Inevitably, however, many of these mines reached the position where their continued existence was of economic importance to the Government rather than to the shareholder who invested the risk capital. A great deal of thought had been applied to the problems presented by these "vulnerable mines", but with the two obvious ex-

pedients—a subsidy, or abolition of tax—useless, and with little hope of a higher gold price their continued existence was difficult to justify.

Mr. Anderson's view of this problem was that when a mine became unprofitable, the interests of shareholders were best served by closing the mine, selling the assets and making a return of capital which could be available for re-investment in new and potentially more profitable mining ventures. Nor was it, he felt, in the interests of the country to continue, by whatever expedient, the production of gold at an unprofitable mine if alternative employment was available for the employees. Essentially, therefore, he believed the problem to be one of moving men from one job to another with as little disruption as possible.

By contrast the government had informed the Chamber that in the general interests of the country and the local communities it was anxious to prolong the lives of the vulnerable mines beyond the point of profitability to shareholders, so as to have a greater quantity of gold extracted and to cushion the effect of their ultimate closure on the local economies by giving time for the establishment of new enterprises.

At present the Chamber is co-operating with the Government in an attempt to arrive at a workable solution which might postpone for a period the inevitable closure of the present " vulnerable mines ". To this end the Chamber has placed certain proposals before the Government on how a solution to the problem may best be sought. But as the whole subject is still under discussion, Mr. Anderson could not intimate in any way the nature of these proposals beyond saying that the Chamber hopes that the interest of all parties could, to some extent, be met.

Another important section of the gold mining industry is its lusty offspring, the uranium industry, about which Mr. Anderson made several interesting comments. In particular, he supported the view of other leaders in the industry that after the expiration of the present uranium contracts, South African producers would be in a sound position to meet competition on the open market for this material. This belief is based, first, on the fact that uranium production, mainly associated as it is with the mining of gold, renders economic the treatment of large quantities of low-grade uranium ore; and secondly, the regularity and consistency of the orebodies in the existing fields simplify the planning of operations and also make possible an accurate assessment of ore reserve. In this latter connection, he points out that a Government estimate of South African reserves of uranium-bearing ore totalled 1,100,000,000 tons with a uranium oxide content of some 370,000 tons.

A point not generally appreciated and which may have considerable beneficial effects on certain of the gold-uranium producers is that the South African Minister of Finance has promised to investigate during the parliamentary recess the possibility of divorcing the taxation payable on the profits arising from the production of uranium, from the present high tax imposed on the production of gold.

THE FEIRA CARBONATITES

The tempo of geological activity in Northern Rhodesia has in no way diminished, states the Department of Geological Survey in its annual report for 1956. Highlights of the year were the acquisition of a new and well-equipped headquarters building, the mapping of 3,450 sq. miles of country (most of it not previously mapped), near-completion of the Kandabwe Coalfield exploration, and the discovery of at least one new mineralized field which may well prove important economically.

The most important mineral discovery during the year was undoubtedly that of pyrochlore in the Feira carbonatites with the minerals monazite, manganese, barytes and vanadium. In one place, small booklets and specks of vermiculite were noted, but it appears only remotely likely that this mineral will assume any economic significance in the area. By the end of 1956 investigations in the field and the laboratory had not proceeded far enough to warrant any positive assertions in regard to the potential economic significance of the Feira discoveries. Nevertheless, it is of value to know that intensive search is still capable of producing new mineral finds in new areas.

The main facts ascertained in the preliminary study of the carbonatites were that there were no less than four separate occurrences; that in all of them the carbonatites or soils contain pyrochlore; and finally, that in the largest occurrence, that in Chakweva, which occupies a probable area of over five sq. miles, the pyrochlore appears to be much more easily concentrated than in the Chasweta occurrence, with which it was compared. In samples from Chasweta the pyrochlore tended to be swamped with barytes; in separations from the Chakweva material, a 70 per cent concentration of pyrochlore was effected by straightforward acid leaching, followed by bromoform and magnetic separations.

After two deflections, the deepest exploratory drill hole in the Kandabwe coalfield was finally completed at 919 ft. 6 in. Two other deep holes were then drilled, one at the south-western extremity of the field (which failed to intersect the main seam, thus confirming the results of the shallower drilling at that end), and one at the north-eastern limit of the seam as indicated by the shallower holes. This is the final hole to be drilled and at the end of 1956 it had reached a depth of 588 ft. The completion of this exploratory boring will mark the end of the drilling programme at Kandabwe. Upon receipt of the analytical results, it will be possible to complete the report on this potentially important coalfield.

N.C.B. SHOWS BIGGEST PROFIT

The tenth annual report on the running of the nationalized British collieries made the brightest reading of any so far in disclosing a financial surplus for the year of £12,800,000. This is the largest profit since nationalization and compares well with the 1955 deficit of £19,600,000. Coincident with the publishing of the annual report came the news that coal prices in Britain are being raised by at least 6s. per ton—the first increase since the Board pegged prices in June of last year—in order to offset substantially increased production costs applicable during the current year.

Overall productivity improved in 1956, 812 man-shifts being worked per 1,000 tons saleable output compared with 816 in 1955. Total cost of production was 74s. 5d. per ton during the year under review—7s. 2d. more than in the preceding year—and at this figure production and selling prices are below those obtaining in any other European country.

One of the brightest features of the report was the section dealing with mine safety, and although one cannot be complacent about the 318 fatalities and 1,731 serious injuries recorded, both figures are lower than in any year since records were first compiled. Absenteeism, both voluntary and involuntary, was higher than in the previous year, largely due to an increase in the number of unofficial stoppages. During the year 5,250,000 tons, mainly of large coal, were imported and sold to consumers at the same prices as equivalent qualities of British coal, so incurring a loss to the Board of 65s. 7d. per ton.

Economics of Gold Mining in Ghana

By G. Keith Allen, B.M.E.

Reader in Mining Engineering, Royal School of Mines, and newly-elected President of the I.M.M. In this issue we conclude our extracts from his presidential address.

BEFORE 1944-45 there was no income tax in the Gold Coast, but the gold mines paid an Export Duty amounting to 15 per cent of the difference between the traditional price (84s. 11½d.) and the current price of gold. In 1939 a war-time surtax was imposed in addition, amounting to 50 per cent of the price of gold in excess of 150s. per oz. Between 1939 and 1945, i.e. during the war, these two taxes amounted together to almost 21s. per oz. After the war the surtax was abolished, but to make up for this loss to the Treasury the Export Duty was increased to 20 per cent, with some relief granted to those gold mines which would have made a loss had gold remained at 84s. 11½d. per oz.

The Export Duty was especially heavy on the mines with a low margin of profitability, because it was levied irrespective of profit. It was also a bad tax in principle since it was a direct charge to working costs and raised the minimum payable grade on which reserves were calculated.

In 1952 the Export Duty was replaced by a Minerals Duty imposed on all mineral-producing companies. This was a graduated tax based on the ratio of profit to revenue, and so devised as to favour mines of low profitability. Although the Minerals Duty to some extent overcame the objections raised against the Export Duty, like the latter it did not rank for double taxation relief and thus there remained a burden on the mines which was not borne by the other companies in the Gold Coast. The Government is taking steps to amend the Tax Ordinance to enable the mines to claim Double Taxation relief of Minerals Duty.

The standard rate of income tax in Ghana is at present 9s. in the £. In 1947, when the low-grade mines were struggling for their very existence, it was 7s. 6d. plus 1s. Profits Tax, equal to 8s. 6d. in the £, but including United Kingdom Tax the companies were paying nearly 13s. in the £ until they obtained relief under the Double Taxation agreement of 1947. In addition to this, they paid in Export Duty about 17s. 6d. per oz. of gold produced.

Productivity

Attempts to increase working efficiency in the early post-war period were made by the use of incentive bonus schemes, but by 1949 it could not be claimed that much success had resulted. The principal difficulty was that the mines lacked the staff that is necessary for the assessment of work values and the setting of bonus rates if such schemes are to be satisfactory. To overcome this it was decided to obtain the assistance of a firm of industrial consultants to train staff in the practices of method and work study, incentive bonus setting, planned maintenance and other modern methods of operational control. The work commenced in 1950 on two quartz reef mines, two banket mines and the Marlu opencast mine. After a year or more there was a steady improvement. At one quartz reef mine, for example, productivity measured in terms of tons milled per month per African employed underground has increased from 12.9 in 1950 to 18.5 in 1957, an increase of 43 per cent, and on the other from 10.03 to 15.6 tons, an increase of 56 per cent. On the two banket mines increases of 34 and 60 per cent approximately are recorded, and at Marlu, before it closed down in 1955, excellent results were also obtained. Here the bulk of the application was planned maintenance of the shovels and rolling stock.

Similarly, other factors, such as increased mechanization of underground operations, increased supervision and especially a change made in 1952 from the use of conventional drill steel to tungsten carbide-tipped drills, also were significant.

Recent Events

From the time in 1945 when, as mentioned, the Mines Employees Union was formed. the industry has been bedevilled by many stoppages of work, usually arising out of wage demands. The one-month's strike of 1947, already referred to, was a serious setback to the industry, but not nearly so serious in its effects as one of three months' duration that commenced in November, 1955. Before the strike ended, the Taquah and Abosso Company was forced to close down and abandon its workings because it could not afford the loss of revenue due to the stoppage, nor the rise in wages that faced it. The effect of the strike on the rest of the mines, though not so catastrophic, was serious, especially for those of marginal grade.

A Board set up by the Government to inquire into the economic condition of the industry commenced its hearings during the strike. In its report, made after a wage settlement involving an increase of more than 10 per cent in basic wage rates, it recognized the resulting precarious position of the low-grade mines. Having in mind the importance to the country of gold production it suggested that Government aid should be given temporarily to mines of low profitability. It is greatly to the credit of the Ghana Government that this advice was accepted and these mines granted in consequence a subsidy of £100,000 per annum for two years. Although too late to save Taquah and Abosso, this realistic action and the revision of the Tax Ordinance will, one hopes, greatly help the industry.

I have now come to the end of my outline of gold mining in Ghana from early to modern times. Of its future I hesitate to make predictions. Speaking of the field as it is known to-day I believe events will prove that its peak gold production was reached in 1941—but the possibilities are not exhausted. An increase in the price of gold could make payable large tonnages of reef which are available but at present unpayable, and looking to the more distant future one wonders whether there are not orebodies in the Birrimian and Tarkwaian Series where they are covered by the Voltaian sediments. This cover is in places only a few hundred feet thick, and given the incentives, economical methods might well be devised to locate such mineral deposits as may exist there.

The Use of Punched Cards in Geology

Punched cards are finding rapidly widening fields of application in industry, research and public administration for the recording, classification and analysis of data. An indication of their wide potential scope in geology and mining is afforded by a paper published in the latest issue of "Economic Geology", under the title "Application of Punched Cards to Geologic Data concerning Uranium Deposits in Sandstone", by W. I. Finch, Vol. 52, No. 2.

RESOURCE studies of various mineral commodities by the U.S. Geological Survey include among their main objectives the systematic compilation and synthesis of the vast quantity of published and unpublished geologic information accumulated through 14 years.

Uranium geology is outstanding from the viewpoint that never in history has there been such a beehive of activity in geologic studies, exploration, and research on any one commodity as there has been on uranium in the past eight years. The great number of reports, particularly on uranium in sandstone, is overwhelming. The problem was to find a method of handling this mass of both qualitative and quantitative data so that the items are easily recoverable in various combinations; and, also, to design a file card that would contain a brief summary as well as much of the pertinent data. After consideration of several types of file cards, the manually-operated punched card of a type already used in scientific studies was chosen because it can be used to accomplish these objectives and also to serve as a bibliographic card. The punched card for sandstone-type uranium deposits was primarily designed for data on a single ore deposit or a group of closely related ore deposits. However, topical data on mineralogy, petrography, chemistry, geochemistry, stratigraphy, gamma-ray studies, isotope studies, and other geologic studies, can be punched and summarized on the card. Data concerning other metalliferous deposits that occur in sandstone can be recorded on the card.

The punched card used in this study is an 8-in. x 10½-in. card. The number of items that can be punched along the edge is limited. Thus, a careful selection was made of items to be punched. Although this card is bibliographic in nature, the name of the author or authors of a report and date published have been left off as punched items because of lack of space and the probable slight use of these items in looking for a card. Only data on chemical analysis of selected elements are to be punched because of limited space but several holes have been left blank for adding more elements. Many other items were considered but were left off because (1) their use was thought to be slight, (2) small number of cases reported, or (3) the lack of room on the card. A small number of blank holes have been left on the card for the addition of special items.

Although the card is designed to be objective, the compiler must do a certain amount of interpretation of data from many reports.

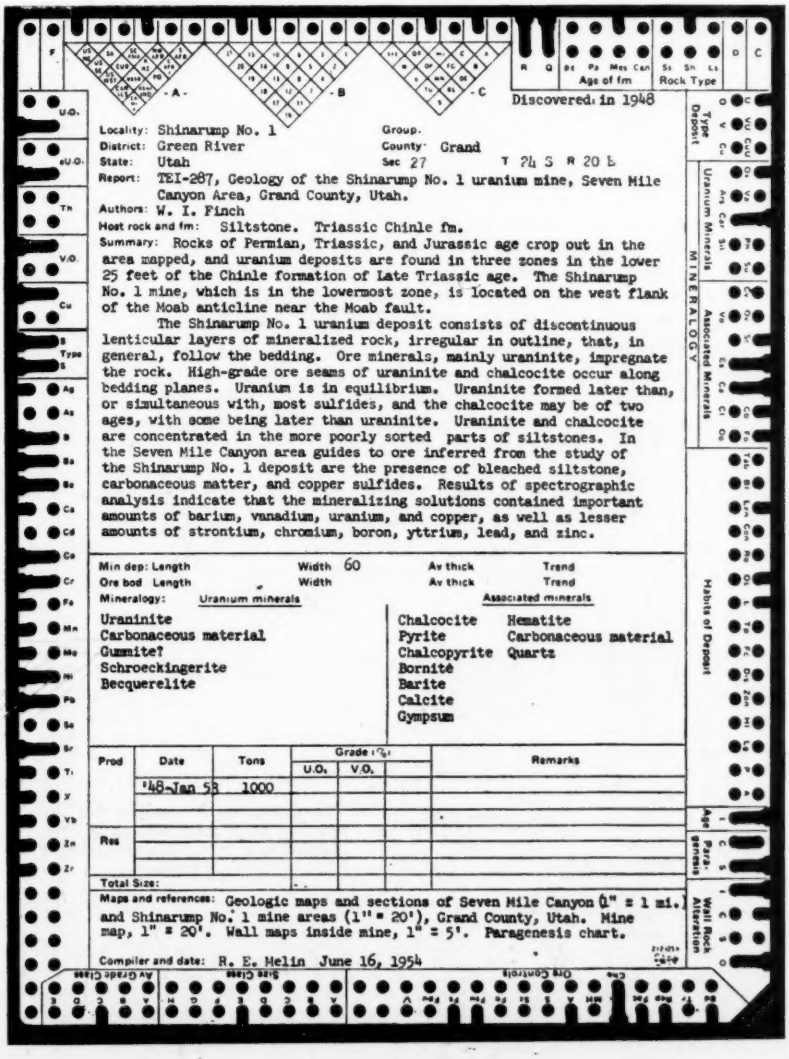
The punched card described in the report has many uses, and new ones become apparent as more cards are filled out. The value of the card as a multiple index to data and as a means of correlating various groups of data cannot be over-emphasized.

As a bibliographical card, the punched card serves as a permanent resource file on published and unpublished reports. The multiple index is an invaluable tool in searching for data on specific items. Answers to questions such as the following can be sought:

1. What data are available about uranium deposits in sandstone in India or some other country or area?

2. What data are available about the geochemistry of vanadium?

Reduced photograph of a punched card, size 8 in. x 10½ in., showing punchings for classifying uranium in sandstone deposits


Discovered: in 1948
Locality: Shinarump No. 1
District: Green River
State: Utah
Group.
County: Grand
Sec 27 T 24 S R 20 E
Report: TEI-287, Geology of the Shinarump No. 1 uranium mine, Seven Mile Canyon Area, Grand County, Utah.
Authors: W. I. Finch
Host rock and fm: Siltstone. Triassic Chinle fm.
Summary: Rocks of Permian, Triassic, and Jurassic age crop out in the area mapped, and uranium deposits are found in three zones in the lower 25 feet of the Chinle formation of Late Triassic age. The Shinarump No. 1 mine, which is in the lowermost zone, is located on the west flank of the Moab anticline near the Moab fault.
The Shinarump No. 1 uranium deposit consists of discontinuous lenticular layers of mineralized rock, irregular in outline, that, in general, follow the bedding. Ore minerals, mainly uraninite, impregnate the rock. High-grade ore seams of uraninite and chalcocite occur along bedding planes. Uranium is in equilibrium. Uraninite formed later than, or simultaneous with, most sulfides, and the chalcocite may be of two ages, with some being later than uraninite. Uraninite and chalcocite are concentrated in the more poorly sorted parts of siltstones. In the Seven Mile Canyon area guides to ore inferred from the study of the Shinarump No. 1 deposit are the presence of bleached siltstone, carbonaceous matter, and copper sulfides. Results of spectrographic analysis indicate that the mineralizing solutions contained important amounts of barium, vanadium, uranium, and copper, as well as lesser amounts of strontium, chromium, boron, yttrium, lead, and zinc.
Min dep: Length Width 60 Av thick Trend
Ore bod Length Width Av thick Trend
Mineralogy: Uranium minerals
Uraninite
Carbonaceous material
Gummite?
Schroeckingerite
Becquerelite
Associated minerals
Chalcocite
Pyrite
Chalcopyrite
Bornite
Barite
Calcite
Gympsum
Hematite
Carbonaceous material
Quartz
Prod
Date
Tons
Grade
U.O.
V.O.
Remarks
Jan 58
1000
Res
Total Size:
Maps and references: Geologic maps and sections of Seven Mile Canyon 0" = 1 mi. and Shinarump No. 1 mine areas (1" = 20'), Grand County, Utah. Mine map, 1" = 20'. Wall maps inside mine, 1" = 5'. Paragenesis chart.
Compiler and date: R. E. Melin June 16, 1954
Age of fm
Rock Type
Type Deposit
Uranium Minerals
Associated Minerals
MINERALOGY
Habits of Deposit
Age
Paragenesis
Wall Rock Alteration
Ore Controls
Size Class
Av Grade Class

3. What localities have a reported occurrence of torbernite, or some other mineral?

4. Where are the uranium deposits in sandstone that contain asphalt-like substances?

5. Where are the uranium deposits in sandstone that contain significant amounts of cobalt or other element?

Correlation studies can be made easily using the punched card. Important common denominators can be sought between certain groups of geologic data for uranium, vanadium, copper, mercury, manganese, and other metalliferous deposits occurring in sandstone in different areas and geologic environments. Some of the more important questions that can be answered are as follows:—

1. What is the distribution of the different size and grade classes of deposits or the deposits in different areas or different age groups of formations, or of different types or habits of deposits?

2. What percentage of the different types of deposits are oxidized? Un-oxidized?

3. What elements (listed on the left-hand side of the card) are diagnostic of the large-size classes? In different areas?

An important use of the punched card is to compile resources of uranium in sandstone for the world, United States, and smaller areas. Although much of the data may be out-of-date or of different calibre, orders of magnitude can be made of the resources. One use that has become apparent after reviewing many reports is that the punched card is a good check list for the completeness of reports. A quick check by the author, supervisor, or critic, will reveal the inadequacies of a report on uranium deposits in sandstone.

Another use of this card is to compile, file, and analyze field notes.

A New Method of Lining Tunnels

622.281.4

A NEW type of shuttering enabling the concrete lining of tunnels to be carried out with greater speed and efficiency is now being used by De Beers Consolidated Mines, Limited, at Kimberley. The device was designed and built locally and has many advantages over shuttering apparatus previously used. It is described in *Optima*, a quarterly review published by the Anglo American Corporation of South Africa Ltd.

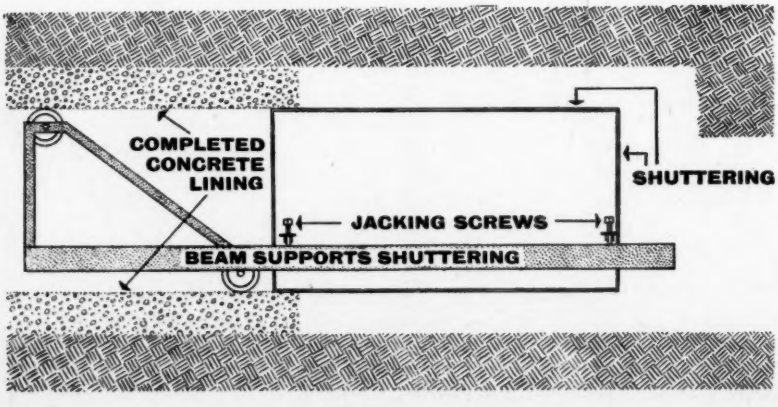
Since the introduction of the block cave method of mining in some diamond mines the concrete lining of tunnelling has assumed great importance. Owing to the nature of the ground the "scraper drifts" (tunnels along which the broken blue ground is moved before being hoisted to the surface) must be given a complete and substantial lining of concrete. It is usually from 2½ ft. to 3½ ft. thick. Hundreds of feet of tunnel have to be treated in this way, and any improvement in technique is therefore of great importance.

The new type of shuttering forms a complete oblong shell. Of fabricated steel, it is 6 ft. by 6 ft. in section and 12 ft. long and is supported by two steel beams to which rubber-treaded wheels are fitted. These wheels, which bear against the floor and the roof of the completed part of the tunnel, hold the shuttering firmly in position during concreting operations and enables the entire apparatus to be moved forward comparatively easily after each pour of concrete has hardened.

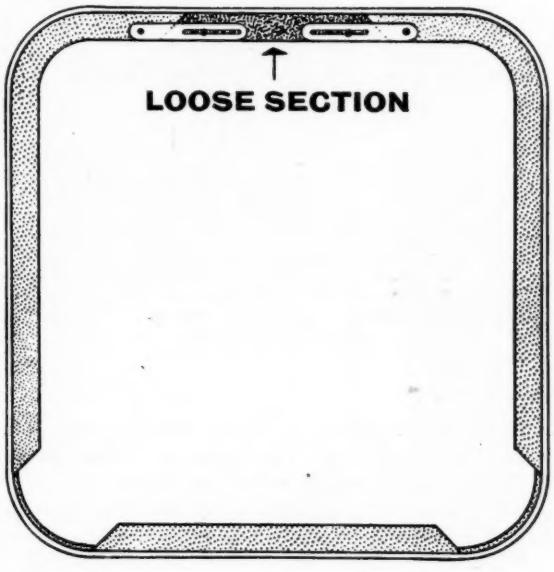
The shuttering is freed from the surrounding concrete simply by loosening a panel in the top section and pulling the sides inward by means of screwjacks. The bottom is freed by raising the shuttering slightly on its supporting beams, also by the manipulation of screwjacks. No dismantling is needed and, once the operations described above have been carried out, the shuttering can be moved forward for casting the next shell with the minimum of labour. When it has been correctly positioned for the next pour, the side frames are returned to "true", the loose roof panel is bolted on and the masking which blocks off the concrete at the front of the shuttering is fixed in position.

Previously it was not possible to cast each section in one piece and so obtain a "monolithic" lining. The floor was poured first, after which the shuttering was collapsed from the completed section, moved forward to the newly laid floor and re-erected for the moulding of the roof and the walls. With this method—apart from labour considerations—there was always the possibility of weakness in the bonding where floor and sides met.

The concrete lining process necessitates the "sliping" (cutting out to greater width and height) of the original tun-



The shuttering in position for the pouring of the next section of concrete lining, the previous section having hardened

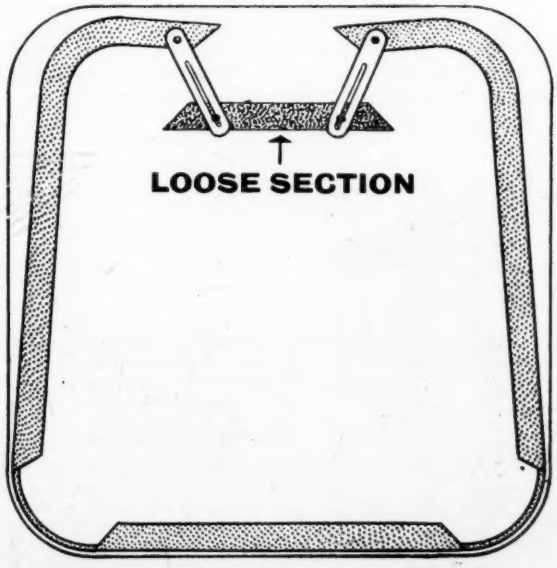


End elevation view of the method of freeing the shuttering from the surrounding concrete

nel as the work progresses. A tunnel developed at dimensions of 5 ft. wide by 7 ft. high is enlarged to 12 ft. by 12 ft. before the lining is added. With the old method sliping had to be kept 30 ft. in advance of the completed concrete lining. This distance can now be reduced to 20 ft., with a corresponding reduction in the danger of falling ground. This danger is further minimized by a shortening of the time lag between sliping and pouring in the lining.

It is possible to operate the device with a box-like attachment at the side. This is an accessory used to mould the concrete lining round openings, known as draw-points, which intersect the scraper drift at intervals and serve to feed the drift with the broken blue ground freed by the caving process in operation above.

Freeing the shuttering from the surrounding concrete. Illustration shows end elevation with shuttering collapsed



Burden of Paid Leave in Australia

PROVISION of long service leave to employees has become an additional charge upon Australian industry, including the mining industry. In the State of Victoria the Long Service Leave Act provides that a period of 20 years' continuous service with the one employer is necessary to entitle the employee to the benefits provided by the Act.

The commencement of the Act was November 26, 1953, at which date the maximum period of leave due was 13 weeks but the entitlement did not operate until December, 1954. No employee whose employment ended, for any reason, prior to the commencing date, irrespective of the number of years service with the same employer, is entitled to long service leave. An exception is that an employee dismissed between May and November, 1953, is entitled to the benefits of the Act if it can be proved that the employer, by such dismissal, is endeavouring to avoid his obligations. Continuity of employment is not broken by periods while men are on strike, or serving in the Forces. Continuous employment prior to the commencement of the Act counts as employment up to 20 years only, previous employment in excess of 20 years being disregarded. At the end of 20 years' continuous employment an additional 3½ weeks' leave can be earned on completion of each extra five years in the employer's service.

Payment for leave is at the ordinary time rate being received at the time leave accrues, irrespective of when taken. Any long service leave or payment in lieu of leave granted before the commencement of the Act shall be taken into account as leave taken under the Act. No employee is entitled to any long service rights until completion of at least 10 years' continuous service with the same employer. When at least 10 years but less than 20 years have been completed and employment is terminated by the employer for cause other than wilful misconduct, or by the employee on account of illness, or other pressing necessity, the employee is entitled to leave equal to one-eightieth of the period of his continuous employment.

Other Provisions

No employer shall knowingly employ an employee during any period when he is on long service leave, and no employee shall engage in any employment for hire or reward during such period of leave. Leave may be taken, by mutual agreement, in two periods, and must be granted as soon as practicable considering the needs of the employer's business. Payment in cash may not be made in lieu of leave unless an employee's services are terminated. Public holidays cannot be added to increase the period of long service leave, but an employee is entitled to his ordinary annual leave in respect of the year in which he takes long service leave.

Apart from this provision, mine employees are granted either two or three weeks' annual leave, according to the provisions in the respective States, on full pay; they receive payment for public holidays, which may total 10 in the year, and a week's sick leave on pay is also granted. A mine employee is therefore paid for five weeks, or six weeks, according to the State in which he is employed, for which the employer receives no return in production. To these charges must be added Workers' Compensation Insurance, which in Victoria, is of a crippling nature, and Pay Roll Tax of 2½ per cent on wages paid, and which is, naturally, influenced by every increase in the basic wage.

Powered Roof Supports in Mines

The introduction of Dowty hydraulic props into British coal mines in 1946 began a period of accelerated progress in the development of mine roof support techniques. Already 1,000,000 Dowty props have been supplied to coalfields in Britain and many other countries. Continued Dowty research has now led to a striking technological advance, namely, the Dowty Roofmaster system of self-advancing, hydraulic powered supports for fully mechanized mining.

THE Roofmaster support units are of two types, basically similar in construction and operation. Each comprises a box-section base, housing the hydraulic operating mechanism and into which are fitted yielding props supporting an articulated top beam. One type known as the fore-support, incorporates two props and a twin-section top beam; the other, or aft-support, has three props and a triple-section beam. In each type the props are hydraulically linked to a control valve for pressurization or release.

A jack in the base of each support is mechanically connected to the conveyor and hydraulically linked to pressure and return lines. These are attached to the conveyor and connect with a power-pack, situated at the gate end. Control valves in the pipe lines attached to the conveyor control the operation of the jacks. Fluid for prop pressurization also passes through the valves before entering the supports through hollow piston rods. The jacks of the fore-supports may be double-acting or single-acting as required for advancing the conveyor. All the aft-support jacks are single-acting.

The system is used with a snaking conveyor on a longwall face. The supports are set immediately behind the conveyor and spaced at regular intervals to suit the roof conditions, fore- and aft-supports alternating.

At the commencement of a cut all supports are in line, with the roof beams set close up to the face, acting as cantilever supports over the conveyor. The prop control valves are in the neutral position and the jacks of the fore-supports are fully extended. The articulated roof beams ensure maximum support contact with uneven roofs and the props of all supports yield independently at 21 tons.

As the power-loader moves along the face, the two props of each fore-support are released by selection of the prop control valve. Operation of a control valve closes the jack, drawing the support up to the conveyor. The props are then pressurized by selection of the prop control valve, bringing the roof beam up to support the newly-exposed face at a setting load which can be varied up to 9 tons per prop. Both control valves are simply operated by a short removable handle carried by the operator.

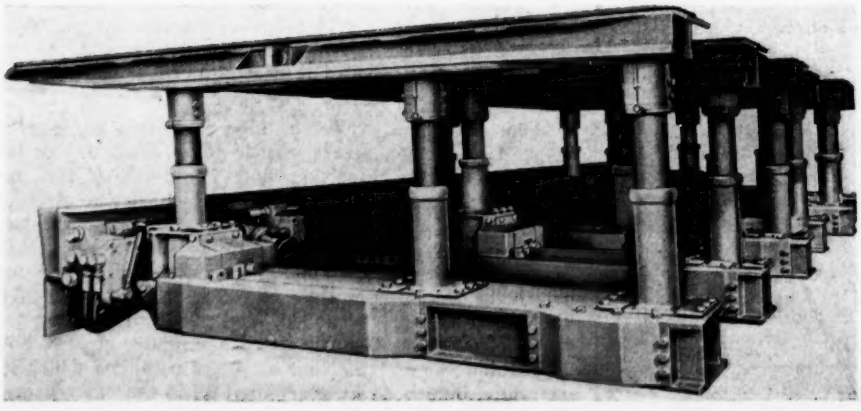
To snake the conveyor over to the new face, a selection is made at the jack control valve for the first fore-support (incorporating the double-acting jack), extending the jack and pushing the conveyor forward. This simultaneously extends the single-acting jacks attached to the advancing section of the conveyor, as in the neutral position the relevant jack control valves are open to return, allowing the passage of fluid expelled from the jacks.

When the conveyor is in its new position, the props of the aft-support unit are released by the prop control valve. Operation of the jack control valve for the aft-support causes the jack to close, drawing the support up to the conveyor. The props are then reset by the prop control valve and the roof beam supports the face similarly to the fore-support. Both supports are again in line, establishing a new caving line. This complete sequence is carried out in succession along the entire face by only three men.

The Roofmaster system provides support for the newly-exposed roof immediately the power-loader has passed. Units are advanced alternately, thus maintaining the support continuously, and affording complete protection for face workers. The articulated roof beams provide maximum contact with uneven roofs and concentration of props at the waste edge gives ideal support for total caving. The large basal areas of the supports effectively minimize floor penetration. Props are hydraulically isolated by non-return valves, and remain set in the event of a power failure.

Operation is extremely rapid, a support unit being released, advanced and reset in a matter of seconds. The base members are sledged for ease of movement, and the control points are readily accessible. Valve operation is simple. A good travelling road for the power-loader team is provided, the hydraulics forming a closed circuit with no loose flexible hoses. All pipe runs are securely attached to the conveyor or boxed in the support bases.

The support units are easily isolated for maintenance purposes. The standard Roofmaster caters for nominal seam heights from 3 ft. to 5 ft. Detachable extensions are provided to allow for temporary increases up to 6 in.



The Dowty Roofmaster support system. The system lends itself to fully mechanized mining and is used with a snaking conveyor on a longwall face

MINING MISCELLANY

Western Titanium NL has exercised an option to buy 892 acres adjoining its existing holdings. Testing has disclosed 3,250,000 tons of heavy minerals in the higher grade section of the deposits and 3,537,000 tons in the lower grade sections.

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An electrolytic plant will go into operation in August at the Larymna nickel works in Greece. It is anticipated that ferro-nickel of greatly improved grade will be produced in the new facility.

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Research has shown that some of the coal seams in Poland contain germanium. The germanium content in the coal seams of the Brzescz and Rudultowy mines is relatively high. Already a few kilograms have been obtained on a semi-industrial scale.

★

The reported discovery last month of traces of nickel has led to a prospecting rush near Val d'Or, Quebec. Two prospectors, then working in Lamotte Township, about 25 miles north of Val d'Or, staked a claim to 1,200 acres and later sold it to the Peruvian Oils and Minerals Ltd. A number of mining companies are reported to have purchased properties adjoining this claim and other claims have since been staked. M. Jean Lavellee, chief geologist for the East Sullivan Mine, and M. Maurice Latulipe, resident provincial geologist in Val d'Or, have described the discovery as being of "capital importance" for the region.

★

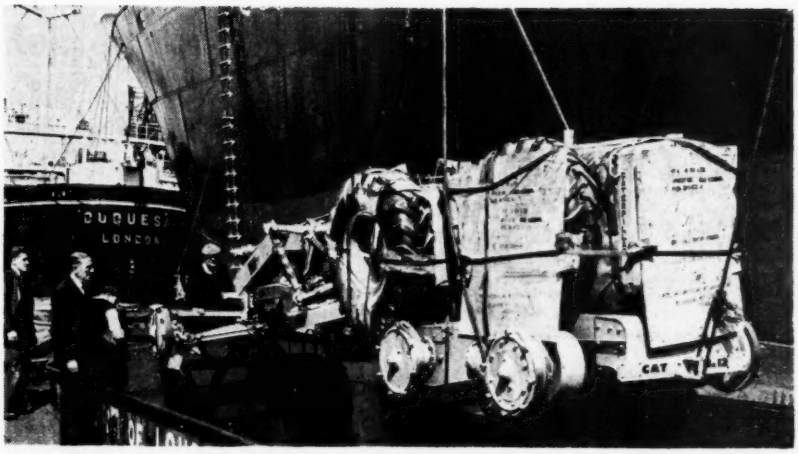
The 174 minerals reported to have been found in Antarctica have been catalogued by Dr. Duncan Stewart, but the first report of high-grade ore was received very recently. A small vein of manganese silicate, in the rare form called "tephroite", has been discovered on Clark Peninsula in Wilkes Land. Tephroite, bearing 60 - 70 per cent manganese oxide, has been found only in three other widely separated localities. In two of these—at Franklin, New Jersey, and Varmland, Sweden—it was associated with large and valuable mineral deposits. So far, it has not been found in sufficient quantity to warrant mining operations.

★

In competition with 200 other items of mining equipment, a British-made project has been selected by a panel of leading American industrialists as the outstanding contribution of 1957 towards the technological advancement of the mining industry. The product is the "Radicon" worm gear unit, designed and built by David Brown Industries Ltd., of Huddersfield, and marketed in America through a subsidiary company in California. The competition is an annual event organized by *Mining World* and judged by a committee of mining executives in San Francisco.

PERSONAL

At the annual meeting of the Transvaal and Orange Free State Chamber of Mines, Mr. H. C. Koch was elected president for 1957-58. The new vice-presidents are Mr. P. H. Anderson and Mr. I. M. Campbell Rodger.



The first of two Caterpillar No. 12 Graders, built by Caterpillar of Australia Pty. Ltd., to be imported into the United Kingdom, were unloaded at London Docks at the end of May. The graders are to be supplied to Derek Crouch (Contractors) Ltd., and they will operate on the company's opencast coal sites in the Durham area, and at Radar North opencast coal site in Northumberland

Mr. Julius Kruttschnitt has been appointed a director of Mount Morgan Ltd.

★

The new president of the Federation of Rubber and Allied Manufacturers' Associations is Mr. Jasper Frankenburg, chairman of the Greengate and Irwell Rubber Co. Ltd., and vice-president of the Research Association of British Rubber Manufacturers.

★

Mr. William Wheeler Coleman has retired from the chairmanship of Ruston-Bucyrus Ltd. Mr. Coleman, who has held this position since the incorporation of the company in 1929, will retain his seat on the board and has been elected honorary chairman. Mr. William Lewis Little, chairman and president of Bucyrus-Erie Co., of South Milwaukee, Wisconsin, U.S.A., has been appointed chairman of Ruston-Bucyrus Ltd. Mr. William Savage, C.B.E. has retired from the board.

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Mr. A. F. ("Archie") Stevenson has been appointed sales manager of the new division of Fred Myers Ltd. dealing with Hyster fork-lift trucks, Karry Kranes, and other equipment in the materials-handling field.

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The official opening of the new factory and offices of the Premier Lamp and Engineering Co. Ltd., at Barras Garth Road, Leeds, 12, took place on June 17. The ceremony was performed by the Lord Mayor of Leeds, Alderman J. Hiley, J.P., who used a specially made silver acetylene lamp to burn through a length of white satin ribbon. This lamp was a replica of the miner's lamp which the company has been producing for many years. By the end of 1949 the company had made 1,000,000 of these lamps and since then it has produced well over 500,000 more.

★

The Engineering, Marine, Welding and Nuclear Energy Exhibition will be held at Olympia, London, from August 29 to September 12, 1957.

The following dates of forthcoming meetings have been announced: The Institution of Mining Engineers, Summer Meeting, Newcastle upon Tyne, July 24 - 26; The North of England Institute of Mining and Mechanical Engineers, Newcastle upon Tyne, August 10.

CONTRACTS AND TENDERS

International Co-operation Administration (I.C.A.) has announced the following procurement for Taiwan (Formosa): 1 mine car loader, shovel type; 3 sets pneumatic sump pump for shaft sinking; 1 air compressor, vertical, 2-stage; 2 diesel engine powered mine locomotives. Project implementation order No. 84-21-007-9-70250. Bids should be sent to Central Trust of China, Purchasing Department, 68 Yen Ping Nan Road, Taipei, Taiwan, (Formosa). Closing date, 18/7/57. B.O.T. Ref.: ESB/15054/57/I.C.A. Telephone enquiries to Chancery 4411, extension 360.

★

India

The National Coal Development Corporation (Private) Ltd. (a Government of India undertaking) invites tenders for the supply of tipplers. Terms and conditions available from the Chief Purchase Officer, 1 Council House Street, Calcutta 1, on production of cash receipt for tender fee of Rs.10. Closing date 19/8/57. B.O.T. Ref.: ESB/15162/57. Telephone enquiries to Chancery 4411, extension 738 or 771.

★

Simon-Carves Ltd. has received from Australian Iron and Steel (a subsidiary of Broken Hill Proprietary) a contract for a complete new coke oven battery and by-product plant at the Port Kembla steelworks. The battery will comprise 96 twin-flue compound underjet ovens in two blocks of 48 ovens each, and will carbonize about 1,000,000 tons of coal a year. It is believed that this will be the largest coke oven battery in Australia.

Technical Briefs

Level Control of Solids

A range of level controls for use with free-flowing solids and non-conductive liquids and based on the principle of the capacity relay or proximity switch are now being produced by Elcontrol, Ltd.

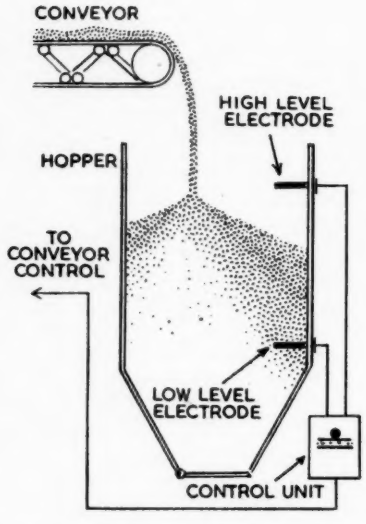
The Elcontrol solid level controls provide automatic and instantaneous signalling or switching at pre-determined high and low levels wherever any reasonably free-flowing solids or powders are being handled. Typical substances that may be controlled in this way are pulverized fuel, flue ash, washed coal, stone, sand and gravel, ores and chemical products.

The controls can be used for controlling the filling or emptying of bulk containers, hoppers, silos; for monitoring the level of materials in conveyors and chutes, and for controlling quantitative mixing by monitoring the feed hoppers.

Each complete proximity switch basically consists of a control unit embodying a circuit operating a relay, together with an electrode of either rod or plate type that is inserted into the vessel at the desired control level. The electrode, which is part of the electronic circuit, has a standing electrical capacity to earth, and this capacity is varied by the approach of a mass having a dielectric constant greater than that of air. When the capacity change is sufficient to bring the circuit into oscillation, the relay in the unit is operated and thus provides a signal and/or operation of a control mechanism —e.g., a gate, valve, conveyor motor, etc., as required. It is not normally necessary for the electrode to come into direct contact with the controlled substance.

Proximity switches are actuated by changes in electrical capacity, which are not easily predictable under industrial conditions, and hence suitability for particular applications should not be taken for granted. Different substances will actuate a proximity switch at different distances from the electrode, so that uniform performance under all circumstances cannot be guaranteed.

There are three standard types of Elcontrol proximity switches. The types all work on the same principle, but are intended for different applications. The CR2 with electrode CLE4 provides operation at a single level and has a lead length of not more than 6 ft. between unit and electrode. The CR3 is available with either plate or probe type electrodes for heavy or light duty. The CR3 is more sensitive than the CR2. Finally, the CR4 is a double level control unit similar to the CR3 and embodies high and low level control or signalling in one unit.



Schematic diagram showing control of conveyor in relation to level in hopper

TIN AND TUNGSTEN FROM SLAG

Research by the U.S. Bureau of Mines has made possible the development on a laboratory scale of four possible methods for recovering tin and tungsten from slags at the Longhorn tin smelter, Texas.

If further research shows that any of the methods are economically feasible on a large scale, the way will be opened to recover several million pounds of these valuable metals from stock-piled slags, and the process might be used to treat slags at tin-smelting operations in other countries.

According to the report, slag discarded at tin smelters throughout the world contains 1 to 3 per cent tin and that at Texas City averages 1 to 1½ per cent tin and ½ to 1 per cent tungstic oxide.

In the laboratory tests on the Texas City slags, a recovery of 90 per cent of the tin and tungsten was indicated. The report states that several areas of study should be investigated in the future.

Studies to improve the methods, techniques, and results are continuing.

HUNGARIAN ALUMINIUM TECHNOLOGY

Interesting notes on recent research into the technological properties and hot working of aluminium are contained in *Hungarian Technical Abstracts*, Vol. 8, No. 3, following reports by Hungarian metallurgists.

The combined effect of small quantities of impurities in primary aluminium pig, such as Fe, Ti, Si, and B, on the most important technological properties of the metal have been investigated by A. Domony. The presence of Ti in the metal has a primary influence on the formation of the macrostructure and on the tendency to hot cracking.

In the joint presence of Ti and B macrostructure formation depends upon the total quantity of alloying constituents. The order of their combined effect is not greater than that of the grain refinement effect of the individual constituents. The electric conductance of aluminium is reduced by the Si, Ti (or V) dissolved in the metal. Si dissolved in the metal can be removed from the solid solution by heat treatment. Ti (or V) may be expelled by the addition of B. The absolute values of the hardening curves plotted for cold working depends upon the quantity of impurities contained in the metal, their characteristics depending upon the dispersion of the alloying constituents in the metal.

Separate or joint presence of Ti and B in quantities of an order of hundredths of per cent has no influence on the corrosion resistance of primary aluminium pig. The effect of 0.1 per cent B on the chemical resistance is in good agreement with an approximately same quantity F.

In discussing phenomena in the hot working of aluminium, J. Schey points out that in order to make clear the processes taking place in the course of hot working 99.5 per cent purity aluminium specimens, most of them cast, were subjected to upsetting, pressing and rolling at 20 deg. C. to 650 deg. C. Recrystallization did not occur during hot forming in the specimens reduced to maximum 75 per cent by upsetting or rolling and to maximum 94 per cent by pressing.

Recrystallization did occur in the hot-formed specimens by the action of subsequent heating, indicating that hardening could also take place in hot forming. Resistance to deformation steadily decreased with the increase in temperature. This also held good for the ability to harden above a certain temperature. The hardness of specimens formed over 400 deg. C. and cooled in water was, however, found to be practically identical.

These observations bear out the fact that hot-forming cannot be considered consecutive hardening and softening only. The tests proved that the reduction of the ability to harden was the sole characteristic of the hot-forming of aluminium.

HIGH METALLIC IRON CONCENTRATE

In the United States, Republic Steel Corp. and National Lead Co. have announced the formation of R-N Corp. to exploit the development by the two firms of a direct reduction process for treatment of low grade and high grade iron ores. The process results in a high metallic iron concentrate.

The process, according to a joint announcement, provides an iron feed material for use in blast furnaces, electric, open hearth and cupola furnaces. Major steel companies have shown considerable interest in the process.

According to the announcement, the principal advantages of the R-N process are:

It treats a wide range of both non-magnetic and magnetic iron ores now requiring separate production processes. The process yields a product of high metallic iron content and uniform composition, low in impurities. Readily available low grade fuels may be used. Phosphorus contained in iron ore in its original form is largely eliminated.

Metals and Minerals

The Mercury Trade in 1956

Speculation and uncertainty regarding the movements of mercury last year have to some extent been dispelled by a comprehensive report prepared by J. N. Greenspoon under the supervision of Richard H. Mote, chief of the Branch of Base Metals, Division of Minerals, U.S. Bureau of Mines. The report is not confined to the mercury trade in the U.S., but also contains tables of exports from the principal producing countries.

In the U.S. itself output of mercury at domestic mines rose last year to 24,200 flasks, representing an increase of 28 per cent over the 1955 production. This increase was due chiefly to the first full year's operation of the Idaho-Almaden mine in Idaho and resumption of production at the Red Devil mine in Alaska.

Stimulated by the high consumption and rebuilding of inventories in the U.S., general imports rose to 52,000 flasks in 1956 from 21,000 flasks in 1955, but they were substantially below receipts in other recent years. As usual, Spain, Italy, Mexico and Yugoslavia were the principal suppliers. Mercury also came to the U.S. from countries that are normally importers and evidently represented re-exported metal.

Mercury consumption increased for most uses, but because less metal was required for chlorine and caustic soda installations, total consumption fell to 54,100 flasks in 1956, being about 3,000 flasks lower than in 1955. Stocks of mercury rose from the unusually low total of 10,000 flasks at the beginning of 1956 to 22,300 flasks at the end of the year. Of the latter total, 21,100 flasks were held by consumers and dealers.

Three new chlorine and caustic soda plants using mercury cells were placed in operation, and capacity at another plant was expanded. Among the principal uses consumption for agricultural purposes (including insecticides, fungicides and bactericides) rose 34 per cent, and catalysts 19 per cent. Agriculture was the largest field of usage, accounting for 9,930 flasks, and was followed by electrical apparatus (9,764), industrial and control instruments (6,114); electrolytic preparation of chlorine and caustic soda (3,351), pharmaceuticals (1,600), dental preparations (1,328), general laboratory use (984), catalysts (871), anti-fouling paint (511), and amalgamation (239). A total of 9,483 flasks was redistilled and other uses accounted for 9,968 flasks.

Mercury quotations in the U.S. ranged from a peak of $275-$279 at the beginning of 1956 to a nadir of $255-$257 in the first part of July. The annual price averaged $259.90, or 10 per cent less than the record figure established in 1955.

Mercury prices in London followed the pattern in the U.S. and declined during the year. Quotations, however, fluctuated more in the U.K. than in the U.S. The annual average price was 15 per cent lower than the record peak established in 1955.

With the removal of export controls in 1956, U.S. exports rose to 1,080 flasks from 451 in 1955 and re-exports to 2,025 flasks from 267.

Actions by the U.S. Government to strengthen the current and future supply situation were continued in 1956. They consisted of exploration assistance by the Defence Minerals Exploration Administration and the guaranteed-price programme of the General Services Administration.

World production of mercury continued the upward trend of the last eight years and reached 197,000 flasks—an increase of 12,000 flasks over 1955. Significant increases in Italy, Japan, Philippines, Spain and the U.S. more than offset decreases in Mexico and Yugoslavia.

Exports from Italy rose to 75,003 flasks from 27,923 in 1955. The principal countries of destination were the U.S. (24,242 flasks), the U.K. (13,735), West Germany (9,796), France (6,846) and Japan (6,353).

Mexico exported 23,077 flasks against 24,236 in 1955, shipments to the U.S. accounting for no fewer than 17,821 flasks. Japan was the second largest buyer of Mexican mercury (1,626 flasks), followed by the U.K. (1,388).

Exports from Spain remained at approximately the same level as in 1955 (32,450 flasks against 32,245). The principal buyers were the U.S. (13,857 flasks), France (3,766), the U.K. (2,733), Sweden (2,249), Brazil (2,244), Japan (1,674) and the Netherlands (1,081).

TREATMENT OF PROBLEM ORES

A new metallurgical and metal-processing plant which may have a considerable impact on the cobalt trade is scheduled to start production next month at Newburgh, N.Y., where it has been installed by Metallurgical Resources, Inc. It represents the first full-scale commercial test of the revolutionary Sill process for treating "problem" ores with high contents of arsenic and sulphur, from which cobalt and other strategic metals are obtained. This process was developed by Dr. Harley A. Sill, a mining engineer and metallurgist, of Los Angeles, after eight years of research and pilot plant testing. It has been patented in the principal cobalt-producing countries—Canada, Belgian Congo, Morocco and Northern Rhodesia; and also in Belgium, where much of the world's cobalt supply is refined.

Hydrometallurgical treatment of the complex ores under low temperature, and a unique purification leaching operation are said to be responsible for the efficiency, economy and simplicity claimed for the process. Advantages over the conventional pyrometallurgical treatment, using high-temperature furnaces, are said to be elimination of costly smelting, high recovery at low cost, high purity of the metals produced, and absence of poisonous arsenical-sulphuric smoke, fumes and fall-out that prohibits pyrometallurgical plants in populated areas.

Production will be concentrated initially on cobalt. Concentrates will be obtained from Canada, principally from Cobalt Consolidated Mining Corporation at Cobalt, Ont., which has just completed delivery of concentrates carrying more than 1,000 s.tons of contained cobalt for defence stockpiling by the U.S. General Services Administration.

The U.S. uses about 75 per cent of the world's cobalt supply, most of which is delivered over long sea routes. It is claimed that, in the event of war, success of the Metallurgical Resources' operation would assure an adequate supply of the strategic metal. Millions of dollars, most of it in U.S. Government subsidies, have been spent on the project and the results will be awaited with keen interest by metallurgists, mining companies, and consumers.

While this development will doubtless be viewed with some anxiety, the long-term effects on the cobalt industry may well be favourable (assuming that expectations are realised), since a cheaper and more efficient method of treating problem ores should assist in improving the competitive position of cobalt *vis-a-vis* other metals.

HIGHER CHROME PRICES

As from Monday, July 1, 1957, the prices of chrome ore in London will be as follows:

RHODESIAN					
Metallurgical (semi-friable)	48%	£19	5	0	C.I.F
Chemical ...	47%	13	15	0	,,
Hard, lumpy .	45%	19	5	0	,,
Semi-friable ...	46%	16	15	0	,,
Smalls	44%	18	0	0	,,
Refractory ...	40%	13	0	0	,,
TRANSVAAL					
Hard, lumpy ...	45%	£11	10	0	,,
Concentrated ..	45%	11	10	0	,,

The price of Baluchistan will remain at £12 per ton, to which it was raised on June 1.

TUNGSTEN SUBSIDY AGAIN REJECTED

Despite Senate restoration of funds for the U.S. Government subsidies for minerals, Congress stuck by its economy drive and again voted to cut them off. The House took this action in approving a $85,600,000 supplemental appropriation measure providing money for operation of various Federal agencies during the fiscal year starting next month. The bill, minus the minerals programme, duly returned to the Senate, which finally agreed to the deletion from it of the $30,000,000 with which it was planned to continue the domestic minerals purchase programme for tungsten, fluorspar, columbium-tantalum, and asbestos.

Most of this money would have been used to continue tungsten production. There appears little doubt that tungsten production would practically disappear in the U.S. without the Federal subsidy,

since a higher grade of tungsten may be purchased at a much lower cost from foreign sources.

It was subsequently announced that the Western bloc of Senators had decided to "shelve" the tungsten purchase programme for the rest of this session of Congress. The implications of this decision are obviously favourable for producers outside the U.S., though the impact on world markets may not be immediately felt.

Meanwhile wolfram ore shipment prices continue to slide. Dealers in London are now quoting a range of 120s. to 125s. per l.ton unit c.i.f. Europe. Fresh buying interest is quiet and some further easing would not be unexpected.

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What is estimated to be one of the biggest wolfram deposits for surface operations has been located in eastern Kwangtung province, China, according to the Geological Bureau of the Ministry for Metallurgical Industry. The veins are spread over an area of at least 10 sq. kilometres.

INDIAN EXPORT CONCESSIONS

The Indian Government has announced the following concessions to exporters and modifications in policy for the export of manganese ore for July, 1957-June, 1958: (1) Ore moved to ports against current quotas up to the end of August, 1957, to be on an *ad hoc* basis provided the shipment was to be made against contracts entered into before the end of March this year. (2) The minimum percentage of low-grade ore (42 per cent and less manganese content) to be shipped would be reduced from 60 per cent to 40 per cent. This condition would not be insisted upon in the case of small exporters whose quota for the period July, 1957, to June, 1958, worked out to 1,500 tons or less. (3) Mineowners whose quota during the period July, 1956, to June, 1957, was 3,000 tons and less would be given the choice to claim their quota for 1957/58 on the basis of 60 per cent of their actual exports in 1955 or 1956 or 75 per cent of their quota during the period extending from July, 1956, to June, 1957.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

Prices on the London Metal Exchange have shown very little alteration during the past week and, as may be expected at this time of the year, turnovers have tended to fall. Technically, all markets seem to be nearing a point where recovery could be sparked off by any small growth of "bullish" sentiment, but at the same time they would be unable to resist the shock of any appreciable lowering of quotations elsewhere in the world. The contangos in copper and lead have been maintained and the backwardation in zinc has shown little sign of widening in spite of labour troubles in Belgium. Stocks of both copper and tin in official warehouses show a further small increase, the total for copper now being 9,998 tons and for tin 2,010 tons.

PRODUCERS MUST HELP TO MAKE L.M.E. QUOTATION

There have been two main subjects of conversation during the week, both referring to copper. The first centring on the meeting to be held on July 3rd by representatives of major British consumers to discuss the proposed new price formula of the Rhodesian producers; and the second on the outcome of the deliberations of the Chilean Copper Department's Executive Board. There has been a certain amount of comment in the Press about the former, and although nothing definite is known about the proposed formula, there does appear to be a danger that the producers are trying to make use in some way of Metal Exchange quotations, but at the same time ensuring that neither they nor their consumers are likely to play any part in the creation of that price.

To the minds of most Metal Exchange men, this seems to be an entirely wrong procedure, as in their view the pricing mechanism of the Exchange could be strengthened and made satisfactory to both sides by more use being made of the market by both producers and consumers, and the general concensus of opinion is that between 25 per cent and 30 per cent of the copper trade of this country should be reflected in dealings on the Exchange.

It is to be hoped that the consumers, when examining the proposal, will bear in mind that a correct and extended use of the facilities of the Exchange can be very favourably reflected in their balance sheets, at the same time enabling them to maintain more freedom of action to prevent the establishment of a producer-fixed price on American lines.

WILL CHILE FLOOD THE MARKET ?

The problem facing the Chileans is of an entirely different nature, as the economy of their country is so bound up with the production and sales of copper; and the Chilean Central Bank have estimated that for every 1 c. per lb. decline in the price of copper, the decrease in revenue accruing from the copper tax amounts to $6,300,000, this being quite apart from the effect it has on the balance of payments.

At the moment there appears to be two schools of thought: the one looking at the position purely from the Chilean angle and asking for an increase in production to make up for the reduced price, the other taking the broader view and realising that it is only by some measure of curtailment of production that any satisfactory basis for the copper market can be re-established in the near future. It is hoped that the second party will prevail, but the history of the Chilean copper industry makes one suspect that increased production will be tried first, and it can be said that the expected attempt by producers elsewhere to stabilise prices at present levels will be stillborn if production in Chile is able to be increased.

★

The copper market has been featureless this week but it was of interest that the production figures for Northern Rhodesia for April showed an appreciable fall from those published for March, the production of electrolytic copper dropping from 22,458 long tons to 20,332, and the production of blister copper dropping from 17,525 to 12,564 long tons, so it is to be assumed that some of the first steps taken to cut-back output are now having an effect on the arrivals of metal in England.

Outside the United Kingdom, the American quotations have remained steady at 29¼ c. per lb. quoted by the producers and 29 c. quoted by custom smelters, but export copper is being offered at least 1 c. per lb. cheaper and the scrap price has shown a slight decline to 22⅞ c. per lb. The U.M.H.K. price has again been reduced to 28.05 c. per lb. parity New York.

BUFFER STOCK BUYING

The tin market in London has been firmer than that in both Singapore and the States, which state of affairs is considered to be due to support action by the Buffer Stock Manager, who is taking the opportunity of rather more liberal offerings of metal to build up stocks. It is now felt that the isolation of pool purchases will not have a marked effect on the structure of the market, as more metal is becoming available, and in this respect it is especially interesting to note that the U.K. output for May rose to the highest for many years, at 3,564 tons.

Contrary to expectations, the world production of tin-in-concentrates during April was higher than in March at 14,300 tons, the Bolivian output especially being prominent. World consumption of tin metal showed little change in March as compared with February. On Thursday morning the Eastern price was equivalent to £770¼ per ton c.i.f. Europe.

POSSIBILITY OF FURTHER CUTS IN LEAD-ZINC PRICE

The lead and zinc markets are still overshadowed by possibilities of further reductions in the quotations in America, with the undertone of the lead market being the weaker of the two. World consumption of both metals remains reasonably steady at the lower levels established during recent months and it is now confidently expected that demand will increase after the summer holidays, although there is some doubt as to whether this increase will be sufficient to absorb all the surplus metal being produced, more especially as the intake into the American stockpiles is likely to decrease, although it has just been announced that the tonnages to be accepted in July will be equal to the increased tonnages accepted in June.

Production of lead continues to rise in America, the mines producing 31,500 short tons of recoverable lead during April, being 2 per cent over the figure for March: the output January-April this year totalled 121,800 tons, compared with 115,700 tons, the corresponding figure in 1956. The same picture is shown in zinc, where production of recoverable metal in April amounted to 51,100 tons giving a total for January-April of 196,500 tons compared to 176,500 for the corresponding period in 1956. Output of refined zinc in the O.E.E.C. countries rose from 71,013 metric tons in April to 73,284 metric tons in May.

Closing prices and turnovers are given in the table opposite.

LONDON METAL AND ORE PRICES, JUNE 27, 1957

THE WEEK ON THE L.M.E.

	June 20 Buyers	June 20 Sellers	June 27 Buyers	June 27 Sellers
COPPER				
Cash	£220½	£221	£220½	£220½
Three months	£222½	£222¾	£221¼	£221½
Settlement	£221		£220½	
Week's turnover	8,725 tons		5,200 tons	
LEAD				
Current ½ month	£90	£90¼	£89½	£89½
Three months	£90¼	£90½	£89¾	£90
Week's turnover	4,750 tons		3,475 tons	
TIN				
Cash	£760½	£761	£761	£761½
Three months	£758½	£759	£758¼	£759
Settlement	£761		£761½	
Week's turnover	700 tons		1,195 tons	
ZINC				
Current ½ month	£72½	£72¾	£73¼	£73½
Three months	£72	£72¼	£72½	£72¾
Week's turnover	4,875 tons		5,775 tons	

METAL PRICES

Aluminium, 99.5%, £197 per ton

Antimony —
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton

Bismuth (min. 1 ton lots) 16s. lb. nom.

Cadmium 12s. 0d. lb.

Cerium (99% nett), £13 18s. lb. delivered U.K.

Chromium, Cr. 99% 7s. 2d. lb.

Cobalt, 16s.-19s. lb.

ORES AND OXIDES

Bismuth .. .. 65% 8s. 6d. lb. c.i.f.

Chrome Ore—
Rhodesian Metallurgical (semifriable) 48% .. .. £17 8s. 0d. per ton c.i.f.
,, Hard Lumpy (45%) .. .. £17 8s. 0d. per ton c.i.f.
,, Refractory 40% .. .. £12 15s. 0d. per ton c.i.f
,, Smalls 42% .. .. £16 5s. 0d. per ton c.i.f.
Baluchistan 48% .. .. £12 0s. 0d. per ton f.o.b.
Columbite, 65% combined oxides, high grade .. .. 185s /197s. 6d. per unit
Fluorspar—
Acid Grade, Flotated Material .. .. £22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2) .. .. 156s. 0d. ex. works

Lithium Ore—
Petalite min. 3½% Li_2O .. .. 40s./50s. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O .. .. 40s./50s. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O .. .. £26 5s. per ton f.o.b. Beira
Magnesite, ground calcined .. .. £28 0s./£30 0s. d/d
Magnesite Raw (ground) .. .. £21 0s./£22 0s. d/d
Molybdenite (85% basis) .. .. 8s. 5d. nom. per lb. (f.o b.)

Titanium Ore —
Rutile 95/97% TiO_2 (prompt delivery) .. .. £57/£59 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO_2 .. .. £11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%) .. .. 120s./125s. per unit c.i.f.

Manganese Ore Indian
Europe (46%-48%) basis 130s. freight plus 5% surcharge .. .. .. 131d./133d. per unit c.i.f.
Manganese Ore (43%-45%) .. .. 106d /108d. per unit. c.i.f.
Manganese Ore (38%-40%) .. .. 100d./102d. per unit. (including duty)

Vanadium —
Fused oxide 90-95% V_2O_5) .. .. £12½-£13½ per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO_2) .. .. £19 per ton c.i.f.

Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram

Gold, 250s. 9d.

Iridium, £27/29 oz. nom.

Lanthanum (98/99%) 15s. per gram

Manganese Metal (96%-98%) £310

Magnesium, 2s. 5½d. lb.

Nickel, 99.5% (home trade) £600 per ton

Osmium, £20/22 oz. nom.

Osmiridium, nom.

Palladium, £8 0s./£8 10s. oz.

Platinum U.K. and Empire Refined £32 oz.
Imported £32 nom.

Quicksilver, £90 ex-warehouse

Rhodium, £42 oz.

Ruthenium, £15/£17 oz. nom.

Selenium, 75s. nom. per lb.

Silver, 78½d. f. oz. spot and 78d. f'd.

Tellurium, 15s./16s. lb.

LONDON STOCK EXCHANGE PRICES, JUNE 26, 1957

Finance	Price June 26	+ or — on week
African & European	55/-	—7½d
Anglo American Corpn.	120/-	—3/9
Anglo-French	22/9	—9d
Anglo-Transvaal Cons.	27/-	—6d
Central Mining (£1 shrs)	61/3	—2/6
Consolidated G'fields	50/-	—7½d
Consol. Mines Selection	31/10½	+7½d
East Rand Consols	1/7½	+1½d
General Mining	57/6	—1/3
H. E. Prop.	7/6	—1½d
Johnnies	50/6	+6d
Rand Mines	65/-	—2/6
Rand Selection	33/9	—1/3
Union Corporation	38/6	—7½d
Vereeniging Estates	93/9	+7½d
Writs	37/6	.....
West Wits.	32/9	—1/3
Rand Gold		
Blyvoors	20/-	—3d
Brakpan	4/4½	—2½d
Buffelsfontein	33/10½	+4½d
City Deep	11/10½	.....
Consol. Main Reef	10/6	—9d
Crown	17/6	—1/9
Daggas	30/6	—3d
Dominion Reefs	15/3	.....
Doornfontein	20/9	—6d
Durban Deep	21/9	.....
E. Champs	2/4½	.....
E. Daggas	7/6	.....
E. Geduld (4s. units)	26/-	—1/-
E Rand Props.	36/10½	.....
Geduld	63/9	—2/6
Govt. Areas	3/1½	—1½d
Grootvlei	14/9	.....
Hartebeestfontein	51/6	.....
Libanon	6/-	.....
Luipaards Vlei	12/3	—6d
Marievale	16/7½	—6d
New Kleinfontein	3/3	.....
New Pioneer	23/-	+1/1½
Randfontein	30/6	.....
Robinson Deep	6/-	—3d
Rose Deep	8/3	.....
Simmer & Jack	3/6	—1½d
S.A. Lands	21/6	.....
Springs	1/9	—1½d
Stilfontein	28/-	.....
Sub Nigel	15/7½	—6d
Vaal Reefs	30/6	—6d
Van Dyk	3/6	+3d
Venterspost	11/3	—3d
Vlakfontein	14/-	—3d
Vogelstruisbult	11/3	—3d
West Driefontein	92/6	—1/3

Rand Gold contd.	Price June 26	+ or — on week
W. Rand Consolidated	30/6	—1/-
Western Reefs	27/1½	—3d
O.F.S. Gold		
Freddies	5/1½	—1½d
Freddies Consolidated	3/9	—1½d
F.S. Geduld	74/3	+2/3
Geoffries	3/-	—1½d
Harmony	22/6	—6d
Loraine	4/3	—1½d
Lydenburg Estates	13/3	—3d
Meuriespruit	3/9	—1½d
Middle Wits	9/-	—9d
Ofsits	52/9	+6d
President Brand	51/6	+1/-
President Steyn	27/-	+3d
St. Helena	27/4½	—3d
Virginia Ord.	9/7½	—1½d
Welkom	15/4½	—1½d
Western Holdings	68/1½	+1/3
West African Gold		
Amalgamated Banket	1/-	.....
Ariston	4/1½	.....
Ashanti	22/3	+2/3
Bibiani	2/9	+1½d
Bremang	1/3½	+¾d
Ghana M.R.	1/7½	.....
Konongo	1/4½	.....
Marlu	¾d	.....
Taquah	6d	.....
Western Selection	5/1½	.....
Australian Gold		
Gold Mines of Kalgoorlie	12/10½	.....
Great Boulder Prop.	13/3	+1½d
Lake View & Star	19/10½	+6d
Mount Morgan	13/-	.....
North Kalgurli	6/9	—3d
Sons of Gwalia	1/8½	—1½d
Western Mining	9/1½	+1½d
Miscellaneous Gold		
Cam & Motor	7/9	.....
Champion Reef	6d	.....
Falcon Mines	7/10½	.....
Globe & Phoenix	21/9	—1/3
Motapa	9¾d	—¾d
Mysore	3d	.....
Nundydroog	6d	.....
St. John d'el Rey	55/6	+6/-
Zams	50/-	—7½d

Diamonds and Platinum	Price June 26	+ or — on week
Anglo American Inv.	170/-	+3/9
Casts.	27/9	—9d
Cons. Diam. Pref. of S.W.A.	10/4½	—1½d
De Beers Defd. Regd.	106/3	+5/-
De Beers Pfd. Regd.	13½	—½
Pots. Platinum	15/1½	+4½d
Waterval	24/9	+3d
Copper		
Bancroft	36/-	+1/4½
Chartered	67/-	—1/6
Esperanza	2/3	.....
Magundi	7/9	.....
Messina	138/1½	—6/10½
Nchanga	10½	+⅛
Rhod. Anglo-American	84/4½	—1/1½
Rhod. Katanga	30/-	+1/3
Rhodesian Selection	20/3	+1/6
Rhokana	35⅝	+⅛
Rio Tinto	95/-	—2/6
Roan Antelope	11/-	+9d
Selection Trust	97/6	—7½d
Tanks	146/3	—11/3
Tharsis Sulphur Br.	4½	—⅛
Tin (Eastern)		
Ayer Hitam	27/-	+9d
Gopeng	16/1½	—1½d
Hongkong	6/6	.....
Ipoh	14/-	—6d
Kamunting	11/6	+1½d
Kepong Dredging	4/4½	—6d
Kinta Tin Mines	28/9	.....
Malayan Dredging	15/-	—1/-
Pahang	17/1½	—4½d
Pengkalen	19/-	.....
Petaling	7/-	.....
Rambutan	19/-	.....
Siamese Tin	13/7½	—1/6
Southern Kinta	21/3	.....
S. Malayan	10/3	—7½d
S. Tronoh	9/4½	+6d
Sungei Kinta	21/3	—3d
Tekka Taiping	9/6	.....
Tronoh	13/4½	—7½d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	10/6	.....
Beralt Tin	44/3	—1/3
Bisichi	4/4½	+1½d
British Tin Inv.	20/9	—1/3
Ex-Lands Nigeria,	2/3	.....
Geevor Tin	18/6	.....

Tin (Nigerian and Miscellaneous) contd.	Price June 26	+ or — on week
Gold & Base Metal	1/6	.....
Jantar Nigeria	3/6	.....
Jos Tin Area	15/3	.....
Kaduna Prospectors	2/-	.....
Kaduna Syndicate	2/6	.....
London Tin	11/-	+1½d
United Tin	9d	.....
Silver, Lead, Zinc		
Broken Hill South	71/6	+3d
Burma Mines	3/4½	+1½d
Consol. Zinc	71/3	—3d
Lake George	7/9	+3d
Mount Isa	27/9	+3d
New Broken Hill	43/6	—10½d
North Broken Hill	105/-	+2/6
Rhodesian Broken Hill	10/1½	+3d
San Francisco Mines	26/-	.....
Uruwira	2/9	—1½d
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A.	2⅜	.....
Associated Manganese	39/9	+3
Cape Asbestos	11/7½	+1½d
C.P. Manganese	23/-	+7½d
Consol. Murchison	46/3	—1/3
Natal Navigation	3½	.....
Turner & Newall	142/-	+2/6
Wankie	18/3	+3d
Witbank Colliery	5½	.....
Canadian Mines		
Dome	$26	—¼
Hollinger	$66	—2½
Hudson Bay Mining	$131	—6
International Nickel	$202	—7½
Mining Corpn. of Canada	£6¾	—¾
Noranda	$98	—4
Quemont	£5	—¾
Yukon	5/7½	.....
Oil		
Apex	61/6	+3d
Attock	53/9	+1/3
British Petroleum	166/3	—5/-
Burmah	114/4½	—3/1½
Canadian Eagle	85/-	—2/-
Mexican Eagle	20/3	.....
Shell	208/9	—3/9
T.P.D.	108/1½	—1/10½
Ultramar	87/9	+6/1½

Mining Finance

Sir Ernest Oppenheimer on Taxation

Production of gold and uranium and the distribution of dividends attained record levels, Sir Ernest Oppenheimer said, when seconding the adoption of the president's report at the annual meeting of the Transvaal and Orange Free State Chamber of Mines held in Johannesburg at the beginning of this week.

The achievements which this statement reflects would be a source of unqualified satisfaction, Sir Ernest continued, were it not for the anomaly that, in spite of these successes, the industry remains out of favour in the traditional spheres of investment both here and overseas. This, declared Sir Ernest, is a matter of no small concern and is one that deserves the attention of those who can influence the affairs of the industry. Many of the factors militating against growing interest in the South African gold mining industry were, of course, beyond the control of the industry itself. But there were certain factors which if changed might well improve the present position.

One of these was the complicated question of taxation, and a study of this was now being undertaken which he hoped would extend to the method of taxing dividend income derived by investors. His own view was that a sound case could be made out for recognition by the tax authorities that part of this dividend income is in effect a return of capital and should be treated as such for tax purposes. Sir Ernest also focused attention on the present lack of uniformity amongst mining groups in the way they reported their operating results to the public. Much additional information concerning uranium production could now be released and provided the industry with an appropriate opportunity for re-examining its procedures to secure greater uniformity with regard to published information.

Referring to the vulnerable mines (additional comment on which will be found in this issue under "Notes and Comments"), Sir Ernest makes the point that to prolong by artificial means the lives of mines intrinsically unprofitable was to interfere with the proper deployment of resources within the national economy to the detriment of the country as a whole.

While operating efficiencies within the industry are today sufficiently high to make further substantial savings in this direction unlikely, Sir Ernest felt that it was possible, with the co-operation of the Government, that the vulnerable mines could be relieved of certain of their burdens to an extent that some of them would be able to continue their operations for a longer time and thereby ease the problems of transition and readjustment as the old mines gave way to the new.

. . . GIVEN STABLE POLITICAL CONDITIONS . . .

Sir George Albu, at the annual meeting of General Mining and Finance Corporation, held in Johannesburg at the end of last week, asserted that given stable political conditions South Africa's future could be viewed as bright.

Referring to the recently growing interest in the Kaffir market, he expressed the opinion that it might be due to a somewhat belated appreciation of the excellent yields obtainable compared with that available elsewhere. This is a matter of particular interest to General Mining, as Sir George said that the reduction of the Corporation's dividend for 1956 was the result of depressed stock markets, and of the need to allocate funds to take up shares in Riebeeck and other new interests.

With regard to Buffelsfontein, further improvements in working profits could confidently be expected, particularly with the start of uranium production during the coming quarter. Sir George also added the weight of his opinion to others in the industry when he expressed the belief that many of the Union's uranium producers would be able to compete favourably in the world market once the present uranium contracts expire.

MIDDLE WITS TO RAISE LOAN CAPITAL

Mr. B. L. Bernstein at the annual meeting in Johannesburg this week said that the raising of a debenture was under consideration by Middle Witwatersrand (Western Areas). The company required additional capital as substantial interests were still held in companies which were unable to reach the profit-earning stage without the provision of additional funds. Furthermore, Middle Wits was directly interested in certain exploration ventures in South Africa and in Rhodesia; and it was the opinion of the directors that money to implement these projects should be made available primarily from new capital. The provision of loan capital would, of course, necessitate the calling of a meeting to increase the company's borrowing powers at which time shareholders would be advised of the board's intentions.

GOLD FIELDS' NEW ISSUE

Details of the Consolidated Gold Fields of South Africa new issue referred to in these columns in our issue of June 14, have now been published.

The issue will take the form of £1,958,404 6 per cent Convertible Unsecured Loan stock, 1977-82, and 979,202 Ordinary £1 shares in combined units of £2 Loan stock and one Ordinary share at a price of £4 per combined unit (being £2 per £2 of Loan stock and £2 per Ordinary share).

Subject to the resolution to increase the capital being passed at tomorrow's meeting and to permission to deal being granted, the offer will be made to registered shareholders as at the close of business on June 19, and to bearer shareholders who lodge Coupon No. 73, in the proportion of one combined unit for every five Ordinary shares held.

The amount of £4 will be payable as to £1 per combined unit on acceptance by July 16 and 30s. per £2 Loan stock and 30s. per Ordinary share on or before August 27.

Holders of the Loan stock will have the right to convert their holdings either as to the whole or as to any part thereof (not being less than £10 nominal) into Ordinary shares at the following rates:

Year	No. of shares for each £100 stk.	Approximate cost based on issue price of Loan stock
1958	40	50s.
1959	39	51s. 3d.
1960	37	54s.
1961	35	57s. 1½d.

Renounceable provisional allotment letters and forms of application for excess combined units will be posted on June 28. It is expected that dealings in the provisional allotment letters for combined units will commence on July 1.

KAFFIRS QUIETLY STEADY

The heavy settlement day following the long three-week account, the persistent weakness of Wall Street and the absence of any encouraging news on the industrial front, contrived to make stock markets dull since our last.

However, Kaffirs, though quiet and with limited buying support, behaved well and went ahead strongly on Wednesday with the newer mines trying to go better on Thursday morning. Free State Geduld is still leading the revival and there has been some sound buying of St. Helena. On the other hand, Middle Wits has been dull on the debenture news and Johnnies went weak on the denial from New York that Messrs. Engelhard and Richdale were endeavouring to acquire an interest in the company. Other mining finance houses are quietly steady.

Copper shares have displayed firmness in spite of the easier metal price and opinion is that no decided trend will emerge until the publication of Nchanga's final dividend. Lead-zincs are generally better, although Consolidated Zinc lapsed on the re-affirmation that the company would not benefit materially under the O.T.C. clause in the Finance Bill. Tins are quiet and irregular.

Elsewhere, Ashanti Goldfields, Ghana's leading gold producer, were a bright feature on the scrip issue news. American buying was in evidence for St. John d'El Rey and the shares went ahead sharply.

NEW BROKEN HILL AND O.T.C.

Mr. L. B. Robinson, chairman of New Broken Hill Consolidated, at the annual meeting held in London earlier this week, said that the Finance Bill in its present form would enable New Broken Hill Consolidated to qualify as an overseas trade corporation.

It was not possible at this stage, however, to say with any certainty whether the taxation provided for in the accounts for 1956, would have to be paid in full or

whether the whole or part of the profits would benefit from O.T.C. treatment. That would not be ascertainable before the end of the year and thus the extent of any over-provision of taxation relating to the 1956 accounts was unlikely to be known before the beginning of 1958.

. . . BUT NOT CONSOLIDATED ZINC

Mr. L. B. Robinson, at the annual meeting of Consolidated Zinc Corporation, re-affirmed the previous announcement from the company that it was unlikely to benefit materially from the Overseas Trade Corporation clause contained in the Bill. As a result of any amendments to the Finance Bill now being discussed in Committee, it might be possible to take a different view, but that remained to be seen.

JOHNSON MATTHEY PAYS MORE

Johnson Matthey and Co., refiners and manufacturers of precious metals, has announced a final distribution of 7 per cent for the year ended March 31, 1957, making a total of 10 per cent against 9 per for the preceding year. Group net profit totalled £945,498 compared with £1,032,747 of which £916,335 is attributable to the holding company. At 57s. 6d. the £1 shares yield 3.5 per cent on the 10 per cent distribution.

GOOD OUTLOOK FOR BELCHER

Further to our note in these columns in last week's issue a report from Montreal this week states that negotiations for both financing and iron ore contracts are expected to be finalized within the next few months. Production planning is envisaged in terms of 3,000,000 tons of high-grade pellets annually, and the cost of bringing the property (which has been described as the largest single magnetite deposit ever outlined) into production is estimated at $75,000,000.

Financial News and Results

Motapa to Cease Operations?—In his statement to members of the Motapa Gold Mining Co., Mr. J. W. A. Wright points out that lack of funds will probably make it impossible to maintain development on its present scale and that some reduction in milling will almost certainly be necessary. "It cannot be expected that profits will be maintained," he went on, "and any further major increase in costs will precipitate the cessation of mining operations".

Bremang's Sounder Position.—In view of improved earnings of £74,590, Bremang Gold Dredging have been able to write off dredge transfer expenditure amounting to £50,000, to declare a dividend of 5 per cent (same) and still increase the carry forward by £12,467. Meeting, London, July 29.

Ashanti Capitalization. — Ashanti Goldfields propose to make a scrip issue of one for two by capitalizing £624,278 from share premium account. Treasury consent has been granted.

St. John d'El Rey.—St. John d'El Rey's loss in 1956 showed a severe increase to £258,979 against £145,803 in 1955. £260,000 was transferred from General Reserve.

Pengkalen's Preference Shares.—The directors of Pengkalen Ltd. announce in a letter to shareholders that Counsel has advised that the preferred ordinary shares must be regarded as having no rights on a winding-up beyond prior repayment of their paid-up capital. They have, therefore, decided that the most satisfactory way of dealing with the matter would be to convert all the issued preferred ordinary shares into ordinary shares, possibly involving a bonus issue to the preferred shareholders. A further communication will be made to shareholders when proposals for capital reorganization have been submitted by the auditors.

Tanjong Tin.—Tanjong Tin Dredging Ltd. have recommended a dividend of 6d. per share, making a total for the year of 7s. 6d. against last year's 5s. The net profit after tax showed a slight improvement at £167,627 (1955—£140,268) but the carry forward decreased to £21,368 from £23,595. Special capital dividends of 8s. per share and profits tax thereon were met almost completely from profit on the sale of fixed assets (£298,412) and a transfer from general reserve (£60,000). Meeting, July 25.

Kinta Earns More.—At £56,166 Kinta Tin Mines' net profit after tax in 1956 was 40 per cent higher than in 1955. A dividend of 6d. is recommended as the "final interim" making 4s. for the year against 3s. 9d. Meeting, London, July 25.

High Water Makes Low Profits.—The Potaro Dredge of British Guiana Consolidated Goldfields produced 12,387 f.oz. of gold in 1956, a decrease of over 5,587 f.oz. on the 1955 yield. This was due partly to unexpected and repeated high-water levels and partly "to other factors now being investigated by the Board". The effect of this was to turn an operating profit in 1955 of £65,067 into a loss of £5,345. The dividend is being passed. Meeting, London, July 15. Sir Roland Robinson, M.P., will be in the chair.

Suddenly There's A Valley.—The Mountain Copper Company group earned only £49,473 in 1956, a sharp reduction from the 1955 figure of £103,601. The dividend, however, is maintained at 9d. per share, a transfer of £30,000 being made from plant replacement reserve. Meeting, London, August 1.

T.P.D. To Go.—Treasury consent has been given for Trinidad Petroleum Development's proposed move to Trinidad. An E.G.M. will be held on July 17 to authorize the move. . . .

. . . While N. Kalgurli Stays Home.—H.M. Treasury has turned down North Kalgurli's second application to transfer control to Australia.

RECENT INTERIM DIVIDEND ANNOUNCEMENTS

Company	Year ending	Dividend Latest %	Dividend Corresponding %	Date payable	Total last year %
Kepong	30. 6.57	12½†	—	July 9	15
Ayer Hitam	30. 6.57	5	10	July 23	40
Sungei Besi	31. 3.57	15	10	July 19	40
Tanjong	31.12.56	25	40	July 6	150

† On 3/- shares after repayment.

CABLE BELT CONVEYOR, width 36 in., length head to tail drum 3,067 ft., lift 360 ft., speed 250 f.p.m., capacity 300 tons p.h., 150 h.p. motor. Available August. For full specifications apply to Logan, Great North Road, Muir of Ord.

GEOLOGISTS. Senior and Junior Geologists required for an exploration programme to be carried out in South-West Africa. Salaries up to £1,800 per annum according to qualifications and experience. Apply: Consulting Engineer, New Consolidated Gold Fields Ltd., 49 Moorgate, London, E.C.2.

MALAYA. Qualified Mining Engineers required for group of Tin Mining Companies. Salary according to age and experience ranging from £1,200 to £1,500 p.a. Provident fund and non-contributory pension scheme. Three years' contracts with six months' home leave on full pay. Excellent prospects for suitable men. Write giving full particulars of age, education, training and experience and marital status to Box 321, Walter Skinner, Ltd., 20 Copthall Avenue, London, E.C.2.

GEOLOGIST REQUIRED BY MUFULIRA COPPER MINES LIMITED, NORTHERN RHODESIA

Applicants must be graduates of a recognized University or holders of equivalent diploma in geology with at least one year's full-time practical experience. An aptitude for research and ability to marshall and present data in a clear and concise form are essential. A good basic salary depending on qualifications and experience plus variable bonus at present 50 per cent on basic salary and cost of living allowance currently £80 p.a. Also generous pension, life assurance and medical schemes. Free outward passage for employee. Leave at 48 days p.a. may be accumulated up to 144 days. Applications, giving personal particulars and details of training and experience, should be made to R.26, Mine Employment Department, Selection Trust Limited, Mason's Avenue, London, E.C.2.

(Southern Rhodesian Gold Returns for the first three months of 1957 appear on page 828.)

GENERAL MINING AND FINANCE CORPORATION, LIMITED

(Incorporated in the Union of South Africa)

CHAIRMAN'S ADDRESS TO SHAREHOLDERS

At the Fifty-Seventh Annual General Meeting of Shareholders held on June 20 at the Corporation's Offices in Johannesburg, **Mr. J. Scott,** Deputy Chairman, presiding at the meeting, said that the net income for the year 1956 was £975,468, an increase of £68,976 compared with the previous year. It had again been necessary to write a substantial amount off Investments, including Subsidiary Companies, the total amount written off being £442,716, of which £150,000 had been taken from Investment Reserve and the balance from Profit and Loss Account. At the end of the year quoted investments had a market value of £14,402,519, compared with a book value of £9,888,929, whilst the value of unquoted investments was greatly in excess of their book value. The Directors had considered it prudent to reduce the final dividend on the Ordinary shares for the year to 2/- per share in view of the Corporation's financial position and the continued depressed state of the Stock Exchanges during and since 1956, with its consequential adverse effect upon the Corporation's revenue reserves.

During the year the Corporation had exercised its right to a substantial participation in the flotation of the Riebeeck Company, and had effected other investments which had absorbed approximately £250,000, these factors having been largely responsible for the decline of £1,642,000 in the Corporation's net cash position. Investments formerly held indirectly through a subsidiary company had been taken over at cost, but this had involved no outlay of cash.

In the past two financial years active Stock Exchange conditions had unfortunately not existed, and the Corporation had been unable to turn over its working capital in the normal way with a view to investment in new enterprises and to the earning of share-dealing profits with which to strengthen reserves. In these circumstances loan facilities of £2,000,000 had been negotiated with Anglo American Corporation of South Africa Limited, expiring on December 31, 1959. The Corporation had availed itself of £1,000,000 of these facilities, but had repaid £500,000 of this sum since the end of the year.

Dividend income should improve in the years ahead as the newer mines in which the Corporation had substantial holdings improved their dividend declarations or reached the dividend paying stage.

The Gold Mining Industry as a whole had shown a working profit £4,000,000 greater than that for the previous year, and new records had been achieved both for tonnage milled and for gold output. For the first time, more than half of the working profit had been contributed by the newer mines, but he could not emphasize too highly the vulnerability of some of the older mines: high level consultations had been held in an endeavour to find a solution to this problem. Uranium was becoming of increasing importance to the industry, the estimated profit realized for the year having been 40% above the previous year, with some mines being primarily uranium producers. World demand should be maintained for many years to come, and the resources of uranium in the country were very large. At the conclusion of their existing contracts many of the uranium producers would be able to compete favourably in the world market.

There had been a noticeable decline in overseas interest in South African gold shares, which had had the result of substantial declines in the quoted prices of mining shares to a point at which the high returns offering on sound mining investments in this country showed a remarkable disparity compared with the low rates obtainable on investments in the North American and United Kingdom financial markets.

One of the factors in the situation was the fact that the Gold Mining Industry was being squeezed between the fixed price for gold and rising working costs, but there was little doubt also that the values of mining shares of this country had been depressed through fears of overseas investors that, despite the soundness of the country's economy, some of the internal political policies might in the future give rise to disturbances undermining the safety of investments. It was important that the country should endeavour to create a stable political atmosphere which, with the basic soundness of the South African economy, would again attract a flow of capital funds. It should be recognized that statements made by politicians and other leading South Africans, together with events which took place within the country, could from time to time adversely affect, as they had in the past, the popularity of the country as a field for investment.

The Chairman then referred to the list of Investments attached to the Directors' Report, and informed shareholders that the majority of the mining companies included did not fall within the group of vulnerable mines. The Corporation also had interests in coal, copper, diamonds and platinum, and in industry, all the Companies concerned having made satisfactory progress in 1956. The Corporation's Subsidiary Companies had also made steady progress.

Since the close of the year the gold and uranium mines of the Group had progressed satisfactorily, the dividend declarations by the Stilfontein and West Rand Companies having been higher than those of a year before, whilst Buffelsfontein Gold Mining Company had commenced gold production in January and had reached a milling rate of over 100,000 tons per month, with steadily increasing profits, those for May being £151,000. Maiden dividends had been declared by Eastern Rand Extensions Limited and Southern van Ryn Reef Gold Mining Company Limited, and the New Pioneer Company had resumed dividend declarations.

Finally, the Chairman expressed his confidence that the Union of South Africa faced a remarkable future with tremendous opportunities for further mining and industrial developments, provided that they could look forward to a period of good government giving rise to stable political conditions.

MINING ENGINEER — Temporary—required for one or two tours of duty on interesting development work by Iron Ore Mining Company in SIERRA LEONE. Position would suit young mining graduate with some survey experience. Salary according to qualifications and experience. Tours of approximately 15 months, liberal leave on full salary U.K. Return passage paid. Initial kit allowance, camp equipment provided. Write giving full details stating age, married or single, to Sierra Leone Development Co., Ltd., Dept. ME.7, City-Gate House, Finsbury Square, E.C.2.

GHANA PUBLIC SERVICE COMMISSION

Applications are invited for the following vacancies in the Geological Survey Department.

GEOLOGISTS (4 vacancies) for geological mapping and the application of geological and geophysical methods to water supply. Candidates must possess First-class or Second-class Honours (Division 1) degree in Geology and be prepared to work under camping conditions. Appointment either on contract for three tours each of 18-24 months' duration in the consolidated salary scale £1,030 to £2,020 a year with a gratuity at the rate of £12 10s. for each completed month of satisfactory service, or pensionable in the salary scale £650 to £1,280 a year plus overseas pay £175 to £350 a year. Entry point in salary scales determined by age and experience.

CHEMIST - ASSAYER (one vacancy) to take charge of the Geological Survey Chemical Laboratory; assay ore of all kinds; carry out silicate analyses of rocks and minerals; participate in research of inter-relation of rocks and Geochemistry. Candidates must possess an Honours degree with (a) Certificate from University of having reached good standard in practical inorganic Chemistry; two-year course of post-graduate training at Imperial College of Science and Technology or (b) at least two years' post-graduate experience in silicate analysis and assaying. Appointment on contract/gratuity terms for two tours each of 18-24 months' duration in first instance with consolidated salary in the scale £1,090-£1,950 a year and a gratuity at the rate of £12 10s for each completed month of satisfactory service.

Other terms of service for both posts: Outfit Allowance of £30-£60 on first appointment. Free first-class passages. Quarters at rental of £60-£90 a year according to salary. Generous home leave. Taxation at low local rates.

Apply for further particulars and application form from the Director of Recruitment, Ghana Office, 13 Belgrave Square, London, S.W.1, giving briefly age, qualifications and experience.